

Remarks

Claim amendment

Applicants amended claim 1 to recite that component (ii) in the claimed mixture, when oriented, induces an alignment of liquid crystals. Support for this amendment appears in the specification in, for instance, Example 3.

Withdrawn rejections

All rejections in the Office Action dated January 16, 2003, have been withdrawn. In withdrawing those rejections, the Examiner stated in paragraph 2 on page 2 of the most recent Office Action that components (i) and (ii) in claim 1 are separate components and that component (i) is not photo-orientable. Applicants agree that claim 1 recites a mixture of two separate components (i) and (ii). Component (i) is a liquid crystal monomer or pre-polymer having cross-linkable groups. Component (ii) is a photo-orientable monomer or oligomer or polymer. Applicants do not agree that component (i) is limited to non-photo-orientable monomers and pre-polymers. The claims and specification do not contain that restriction. The possibility of some component (i) monomers or pre-polymers being photo-orientable is furthermore not inconsistent with the presence of component (ii) that is photo-orientable.

Rejection under 35 U.S.C. § 102(b)

Claims 1-7, 11, 16-17 and 19-20 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,098,975 to Omelis et al. ("Omelis"). The Examiner stated that Omelis discloses a polymerizable mixture comprising (i) a liquid crystal monomer having cross-linkable groups and (ii) a photo-orientable monomer. The Examiner particularly identified the liquid crystal monomer of formula I-A (col. 10, line 20) in Omelis as a liquid crystal monomer having cross-linkable groups, and identified the dye monomer II-A (col. 10, line 25) and azo dye monomer II-C (col. 10, line 35) as being photo-orientable. Applicants respectfully traverse this rejection.

As mentioned in MPEP § 2131, a claim is anticipated only if each and every element in the claim is found in a prior art reference. Omelis does not teach at least component (ii) of the invention, i.e., the recited photo-orientable monomer or oligomer or polymer, in combination with component (i).

The component (ii) monomer, oligomer or polymer of the invention develops a preferred direction when irradiated with the appropriate light. See specification at page 4, lines 22-24 and page 7, lines 16-20. As recited in the claim, the component, when oriented, induces an alignment of liquid crystals. That a component may have the first property does not necessarily mean that it also has the second property. In other words, a component having the ability to develop a preferred direction upon irradiation does not necessarily lead to the property that it will induce orientation of liquid crystals. As explained below, Omelis does not disclose either the dye monomer II-A or the azo dye monomer II-C as having both of these properties.

Omelis mentions at col. 5, lines 52-60 and col. 6, lines 4-6 that certain monomers may be selected that change their molecular geometry when acted on by incident light. In the discussion of dyes that could serve as monomers, extending from col. 5, line 46 to col. 8, line 24, Omelis does not disclose dye monomer II-A in particular as having this property. In addition, Omelis does not disclose dye monomer II-A as capable of inducing an alignment of liquid crystals even if it could be photo-oriented. If the Examiner maintains that the dye monomer II-A of Omelis corresponds to component (ii) of the invention, applicants respectfully request that the Examiner provide reasons for why monomer II-A is believed to be orientable by means of light and why the oriented material is believed to induce alignment of liquid crystals.

The other monomer of Omelis cited by the Examiner, monomer II-C, is an azo-dye. Even if such a monomer was photo-orientable, Omelis does not disclose that the oriented material would induce alignment of liquid crystals. Applicants are not aware of the ability of that material to do so. If the Examiner maintains that the dye monomer II-C of Omelis corresponds to component (ii) of the invention, applicants respectfully request that the Examiner provide reasons for why oriented monomer II-C is believed to induce alignment of liquid crystals.

Apart from the specific comments above regarding monomers II-A and II-C, there is no interest disclosed in the Omelis patent at all in selecting dye molecules to align liquid crystals. There is certainly no discussion that any mixtures exemplified in the patent would or could align liquid crystals. The main objective of the patent appears to be to provide anisotropic liquid crystalline films (see col. 2, lines 7-12), for instance for

use in optical data storage and processing (see col. 2, lines 13-15). To this end, the dyes discussed in the patent are incorporated into a liquid crystalline matrix such that, subsequently, information can be written into such film. See col. 5, lines 52-60 and col. 9, lines 64-67.

The Omelis disclosure appears to relate to the production of a matrix into which dye molecules are embedded. Certain dye molecules may subsequently be locally modified with respect to their orientation and means of irradiation with light in order to store information optically. Generally, this can be done by locally (e.g. bitwise) irradiating such a film with a laser (see col. 5, line 57). Subsequently, the information stored by means of the locally induced orientation in the dye can be read at each local position having been treated with a laser. Non-irradiated spots can, for example, be associated with the information value 0, and a laser-irradiated spot can be associated with the information value 1.

As repeatedly pointed out in Omelis, orientation or anisotropy is induced by mechanical treatment, not by photo-orientation. The mechanical treatment involves stretching the films as explained at col. 9, lines 42-52 and 60-64; Example 1, col. 11, lines 46-49; Example 2, col. 12, lines 50-52; and Example 3, col. 13, lines 32-37. The mechanically induced anisotropy appears to be an important features of the Omelis invention as discussed in col. 1, line 67 to col. 2, line 4.

For at least the reasons provided above, the Examiner has not established a *prima facie* showing that the claimed invention is anticipated by the Omelis disclosure. The comments above also illustrate that Omelis provides no motivation to one skilled in the art to make the selections of material needed to make the claimed invention. As a result, the invention would not have been obvious in view of the Omelis disclosure either.

First rejection under 35 U.S.C. § 103(a)

The Examiner rejected claims 21-25 under 35 U.S.C. § 103(a) as obvious over Omelis in view of U.S. Patent No. 5,706,131 to Ichimura et al. ("Ichimura"). In making this rejection, the Examiner relied on Omelis as teaching a mixture as claimed in claim 1 and on Ichimura as teaching the polymerization of a mixture in a preferred orientation

direction. As explained above, however, Omelis does not teach or suggest the mixture of claim 1. The disclosure of Ichimura does not fill the gaps missing in the Omelis patent to render claim 1 obvious and, as a result, claims 21-25 would not have been obvious either.

Second rejection under 35 U.S.C. § 103(a)

The Examiner rejected claims 8-10, 12-14 and 18 under 35 U.S.C. § 103(a) as obvious over Omelis apparently in view of U.S. Patent No. 5,602,661 to Schadt et al. ("Schadt"). In making this rejection, the Examiner relied on Omelis as teaching a mixture as claimed in claim 1 and on Schadt as teaching the presence of other dichroic dyes and chiral additives and the liquid crystalline phases of the liquid crystal monomer. As explained above, Omelis does not teach or suggest the mixture of claim 1. The disclosure of Schadt does not fill the gaps missing in the Omelis patent to render claim 1 obvious and, as a result, claims 8-10, 12-14 and 18 would not have been obvious either.

Third rejection under 35 U.S.C. § 103(a)

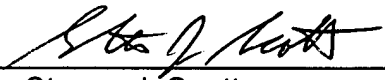
The Examiner rejected claim 15 under 35 U.S.C. § 103(a) as obvious over Omelis in view of U.S. Patent No. 5,589,237 to Akashi et al. ("Akashi"). In making this rejection, the Examiner relied on Omelis as teaching a mixture as claimed in claim 1 and on Akashi as teaching the presence of fluorescent molecules. As explained above, Omelis does not teach or suggest the mixture of claim 1. The disclosure of Akashi does not fill the gaps missing in the Omelis patent to render claim 1 obvious and, as a result, claim 15 would not have been obvious either.

In view of the amendments and remarks above, the pending claims should be patentable over the cited documents. Please grant any extensions of time required to enter this Amendment and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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